



LED stripe mod

Preface

Due to an adapted mass market, it is difficult to obtain electrical engineering for individual requirements within a reasonable period of time. A lack of knowledge and experience, inaccurate planning and a tight budget inevitably lead to the abandonment of projects. Lack of flexibility and creativity, strict draft laws and craft guidelines are the factors that keep the supplier market for modifications small. If you want to establish yourself commercially in this field, you have to offer fundamental technical expertise, general legal education and access to an extensive network.

Since many customers focus on costs in order to remain competitive in the market, preference is given to purchasing electrical engineering from the Asian markets, which often exhibit considerable differences in quality. For example, incorrect power supplies are supplied, European directives are (un)consciously not complied with or orders are too often confused. Especially with average delivery times of up to three months, this can lead to project cancellations. Quantity instead of quality is the motto of competing producers. However, this should not apply to the domestic market in the future.

There are several ways to solve this problem. For example, a [strict import policy](#) is sufficient at first glance, but on closer inspection the cat bites its tail. If imports are restricted too much, inventors, modders and hobbyists close their market for required components, which are often used in the first prototypes. Innovation and invention cannot bear horrendous costs for domestic products and it makes a difference whether a component costs 1000€ or 1€. The primary goal is to develop an innovative and marketable prototype that can prevail against competitors long enough after its introduction to establish itself. The global market is destroying missed opportunities without batting an eyelid and shredding them to economic insignificance, for there is only one fisherman, but many fish.

We do not want to cut back on the quality of the end product, but only on the development path there. Children need inexpensive, easily available components. It is therefore necessary to adapt draft laws, guidelines, subsidies and the lack of digitalisation to these new requirements. Politics is mistaken in the belief that market-changing inventions, innovative products and revolutionary technology are being developed in large corporations. It is still [the one-room apartment](#) where hobbyists use CNC lasers, 3D printers and technical know-how to [create the product of tomorrow](#). The big industry should again learn to promote its own new generation, so that inventions from development to production go hand in hand and copyists from other supplier markets are taken the wind out of their sails.

After this digressive introduction we come back to the central theme, which in this documentation shows how to handle a customer inquiry quickly, creatively, cost-effectively and properly.

Task definition

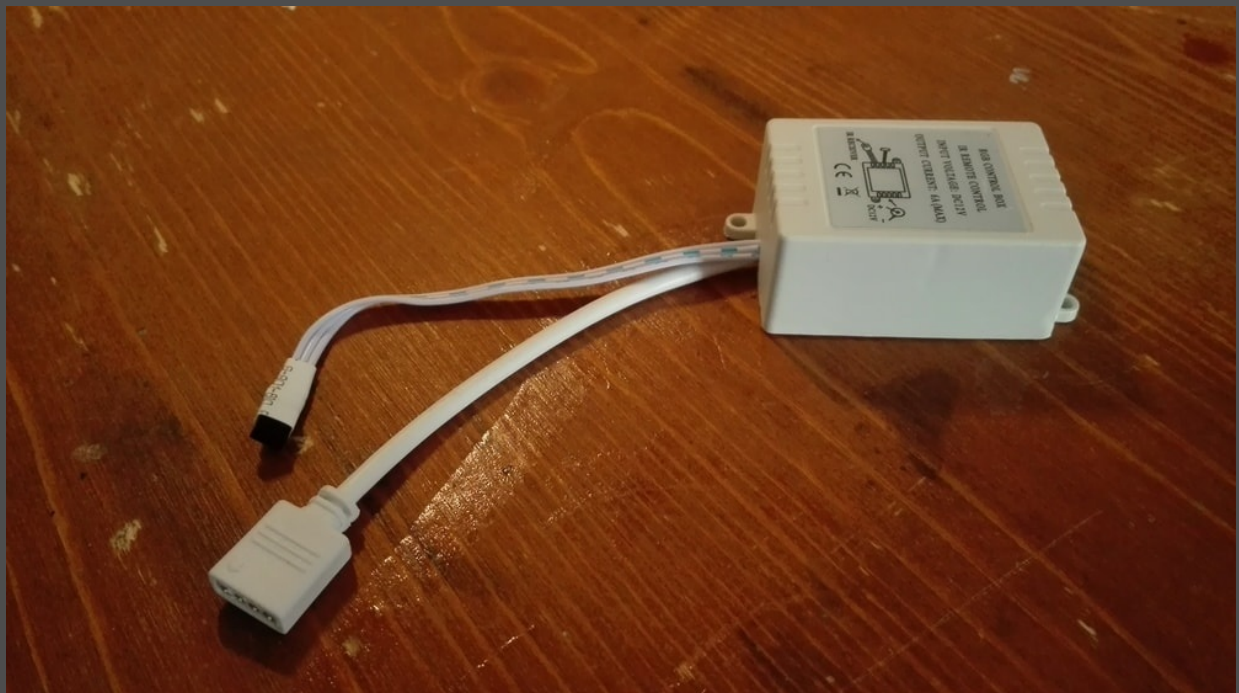
For a customer inquiry, ordered electrical engineering is adapted to the customer's new requirements. This involves simple modifications in which the contractor has taken the most important points from the specifications. The way to the solution implementation is open, since

only the two goals time and functional end product were confirmed as relevant. The points are shown in a short list.

- **Electrical independence:** The customer will use the project in a private club event where there are not enough power connections. It is therefore expected that the modifications will ensure the electrical supply of the device. Excluded are mains plugs, a mobile solution is required. The end product is only used once, so aspects of environmental protection are not to be included in the planning. The power supply must be sufficient for one night.
- **On/Off Toggle Switch:** The customer wishes to be able to switch the power supply on and off independently of the remote control. This switch should be integrated in the plastic cover and should fit into a uniform design.
- **New paintwork:** The plastic covers must be repainted with a colour suitable for clubs; damaged areas or modifications must be concealed on the surface. The goal of creating a prototype ready for presentation is excluded in order to keep to the tight schedule.

Materials

The main component of the project, visible in the upper left corner as a small black rectangle, is the IR receiver, which receives the infrared signal from the remote control. Below the four-pin connector plug, which is connected to the (rolled up) LED strip. Additionally the RGB LED strips with separate cathode on a plastic roller. The remote control, some batteries (customer request) and the other parts you can see in the list below.





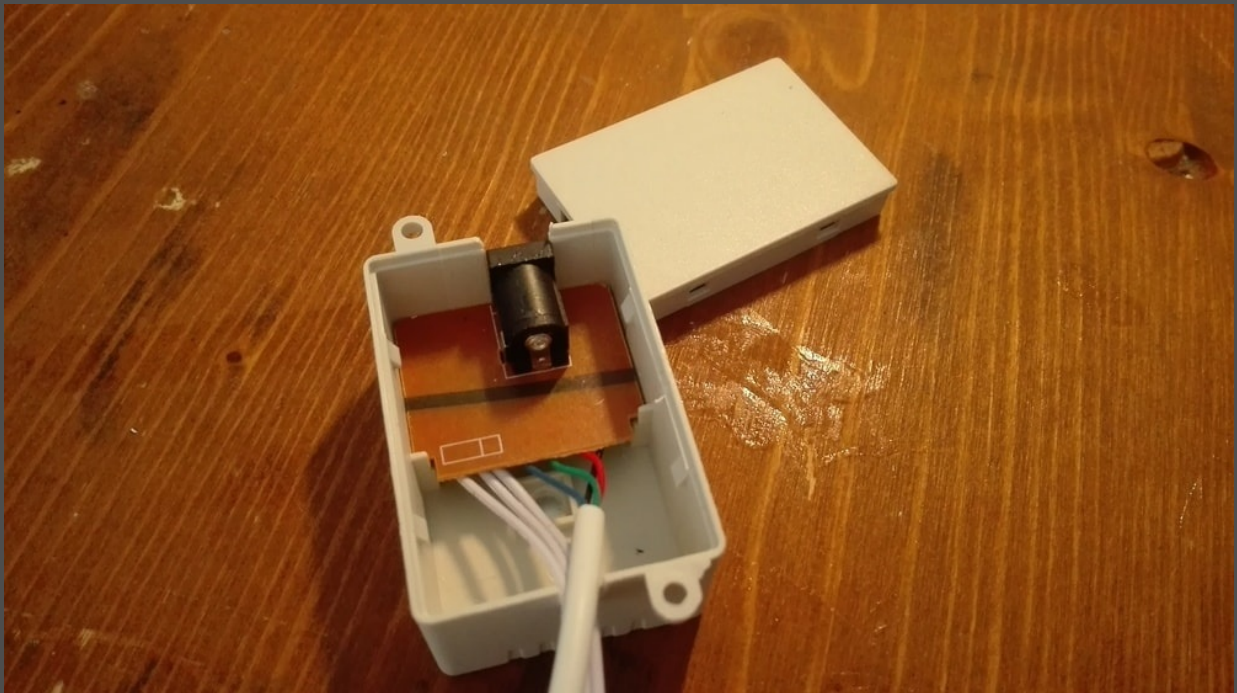


- RGB control box
- LED strip
- Remote box
- Batteries and case
- battery clip
- Toggle
- Cutting disks
- Gimlets
- Sanding paper
- Carpet cutters
- Instant glue
- Braid
- Thin lever tools
- Digital slide
- Pen and paper

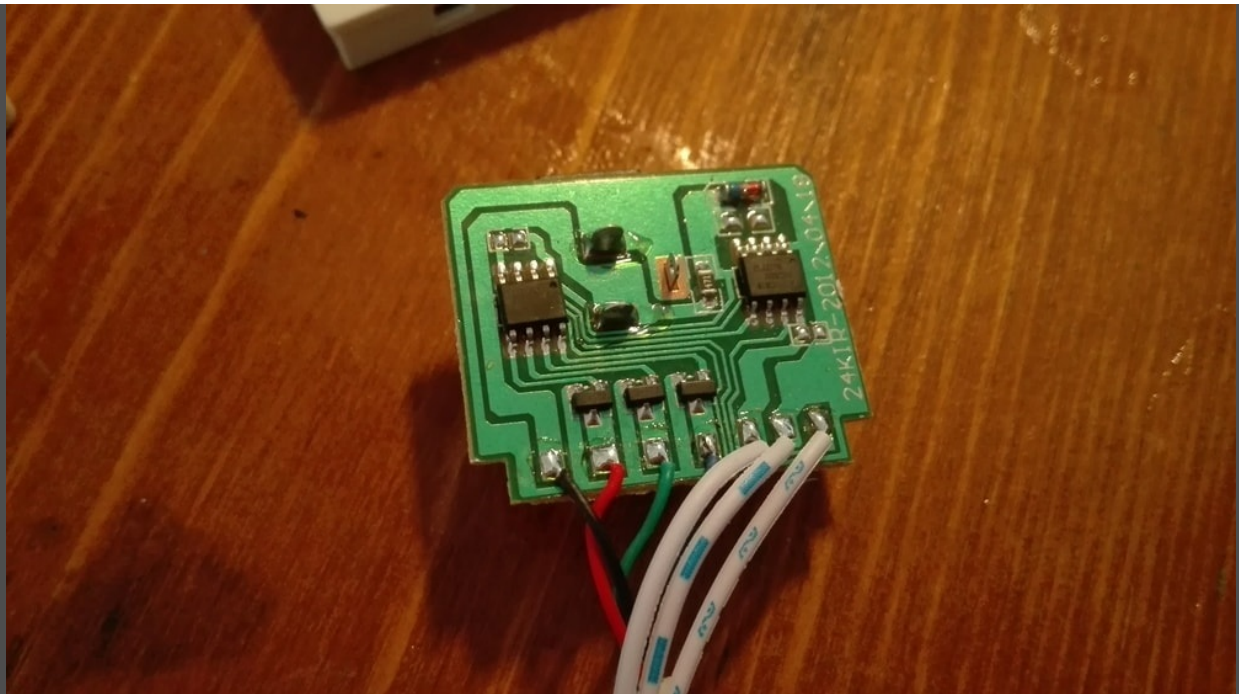
Realisation



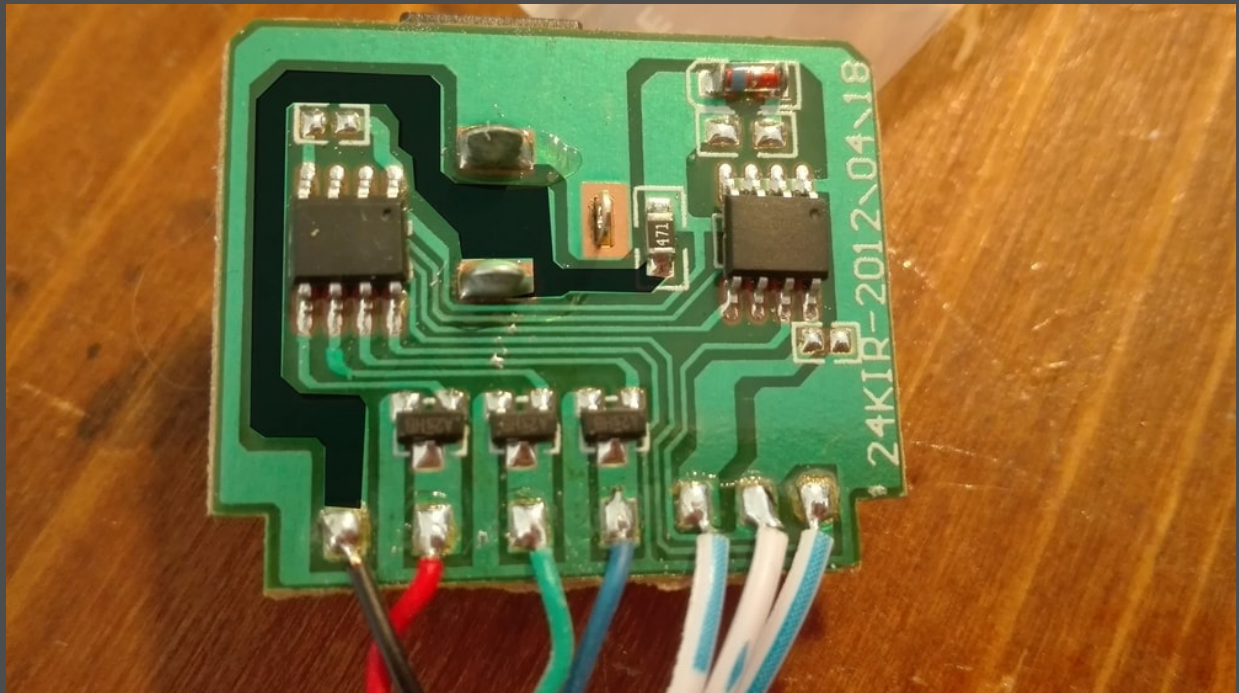
The control box is levered open with the appropriate model knife. You must be careful not to damage them by scratching as far as possible. On each of the long sides there are two clamps that fix the cover and the plastic housing together.



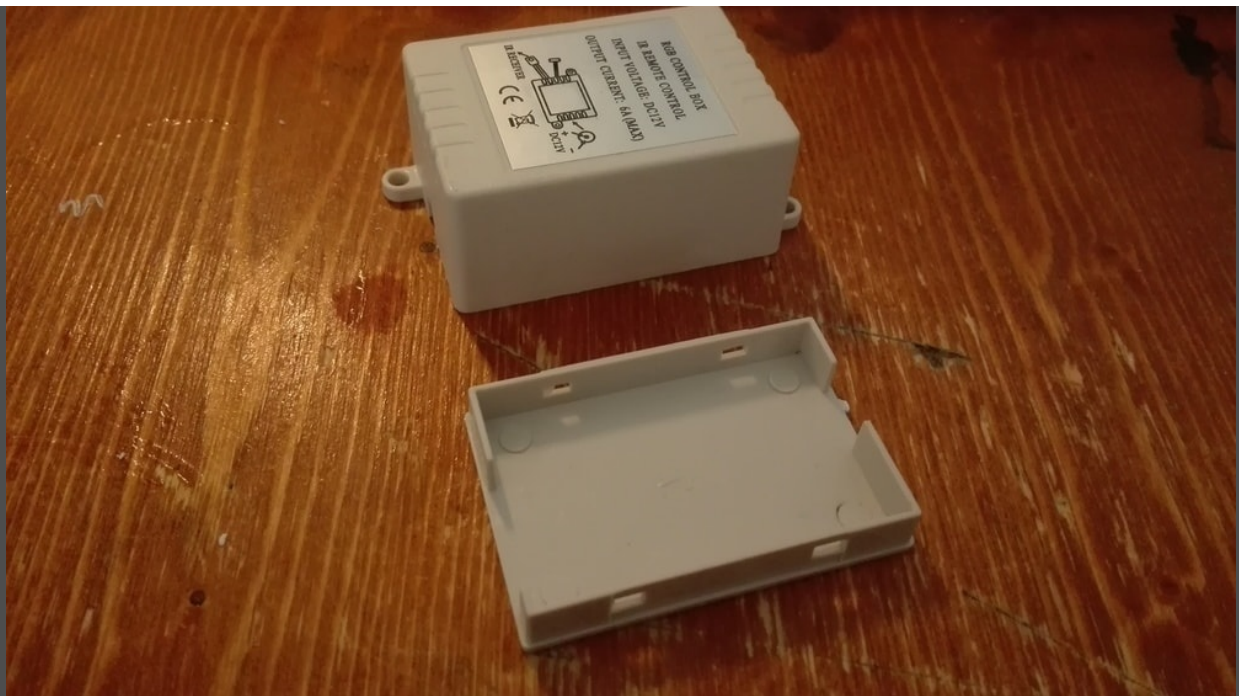
Inside the control box appears the board with the socket for the mains plug and the four-pin connection cables, next to it the cabling for the IR receiver.



On the top side of the main board there are some resistors, microcontrollers, tracks and the soldering points of the wiring. It is a simple board that is easy to understand for an interested person with a little practice and expertise.



To see exactly where the subsequent wiring has to be soldered, it is helpful to download the data sheet from the Internet or, in this case, to follow the traces with your finger. The black cable is often the grounding. I have coloured the grounding again with Gimp, so that one can recognize this more exactly.



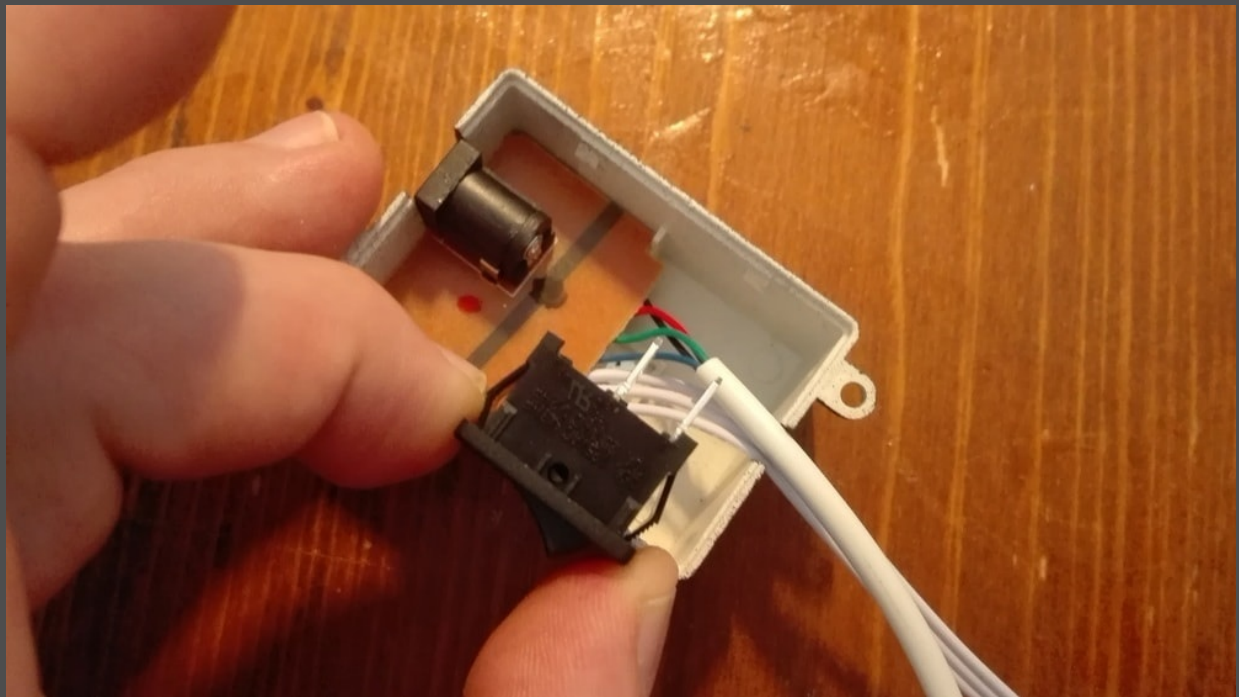
The housing is a product of simple construction. This is good for us, because we have no problems with the new paint (black). We do not have to tape over any additional areas and the silver sticker on the top of the lid can also be simply sprayed over. Due to the customer order it is a project, which only has to work for one night.



If you have to spray small objects and you don't have a spray booth, you can also take a carton. In my case I sprayed foam into the bottom of the box and put cocktail sticks into it. With this you can put parts on the sticks and paint them evenly from all sides without getting the funnel dirty. If there is no ventilation on the carton, please spray the cases only in the fresh air. If you want to be on the safe side, use a respirator mask for painters and latex gloves.



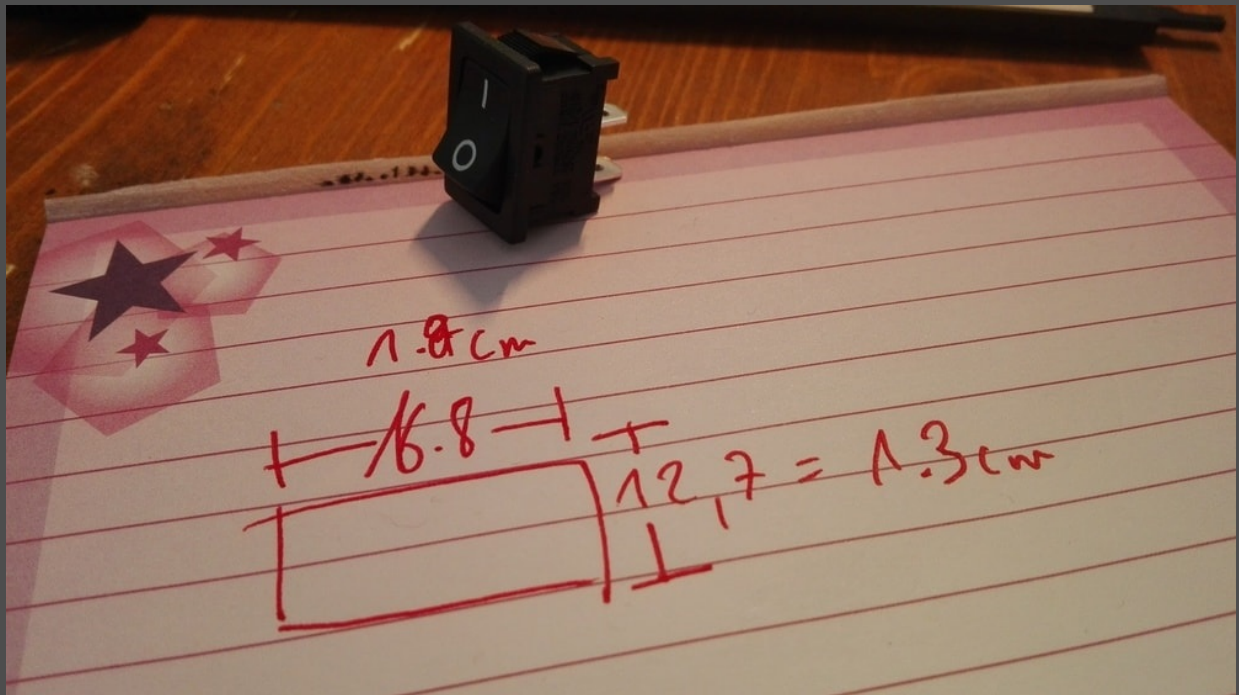
The finished painted housings. Since I have been instructed by the client to make three modifications, there are a few more.



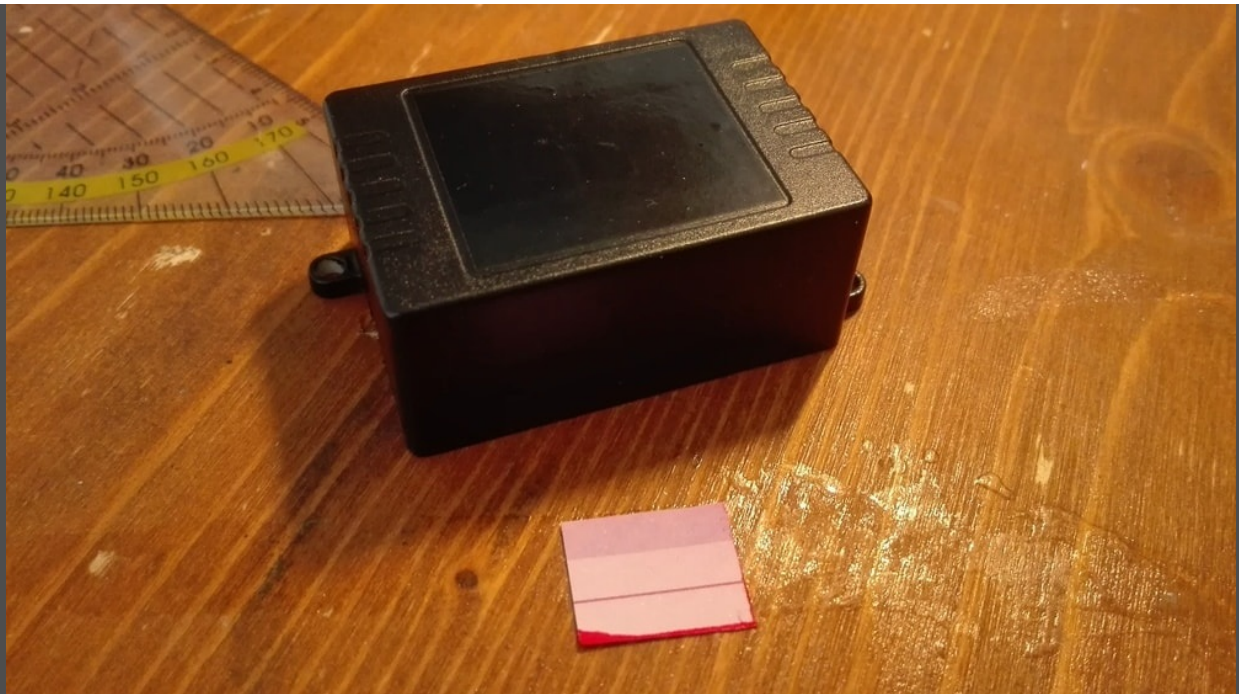
Now we have to see exactly where we will position the on/off switch. It always helps to find an exact place when holding the switch to the housing to get a better picture. For a larger product I would of course use the manufacturer's data sheet and create several industrial design drafts. This is not necessary in this case, because it is really only a simple modification.



We measure the length and width of the switch with the digital caliper gauge. Since we work according to the metric system, all data are given in millimeters.



So that we do not forget this data, we write it down on a notepad. Many people take individual small slips of paper, which are then spread all over the workshop or the study. I advise against it. If you have little money, take a small notepad, this can also be a promotional gift. On business fairs, in the supermarket or in the city centre sometimes some are distributed. This should have at least DIN A6 format, everything else is too small. If you have some money at your disposal, buy a notebook in DIN A4 with blank pages. You can use this as a project book and search for information in a later project, if you have certainly already tried things.

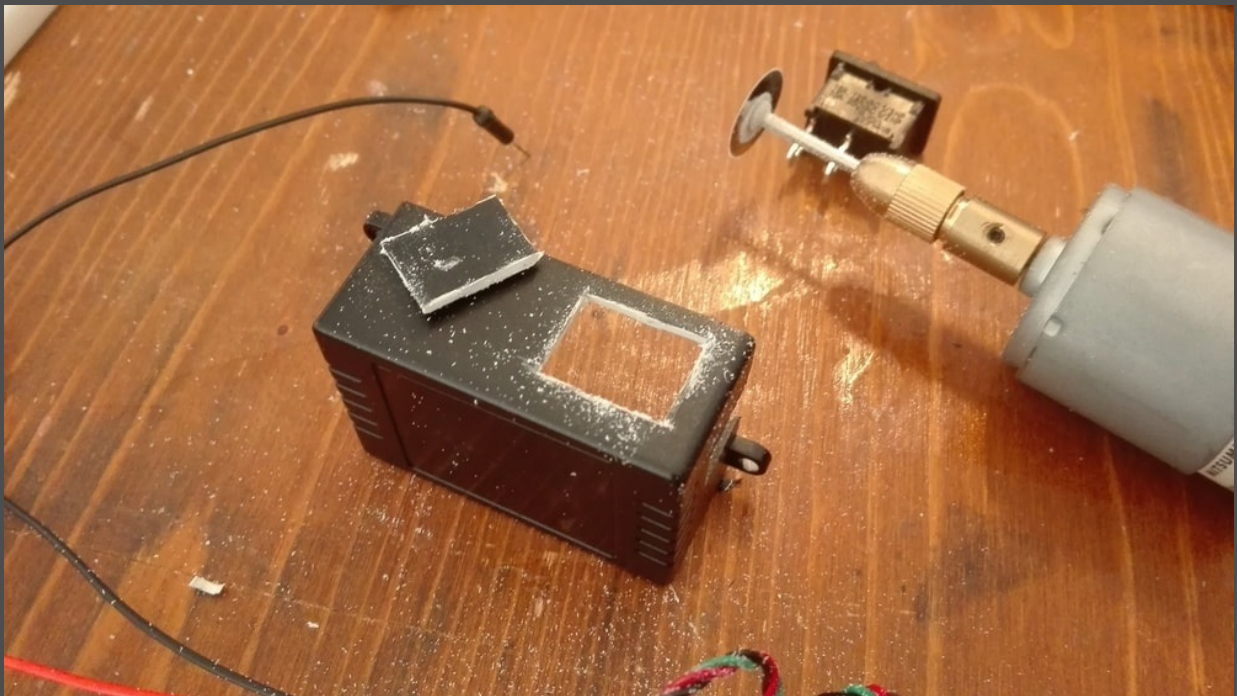


In the next step we draw a small rectangle with the existing data and cut it out with scissors. We can then place it on the case and trace it with a nail or another pointed object. This is not really

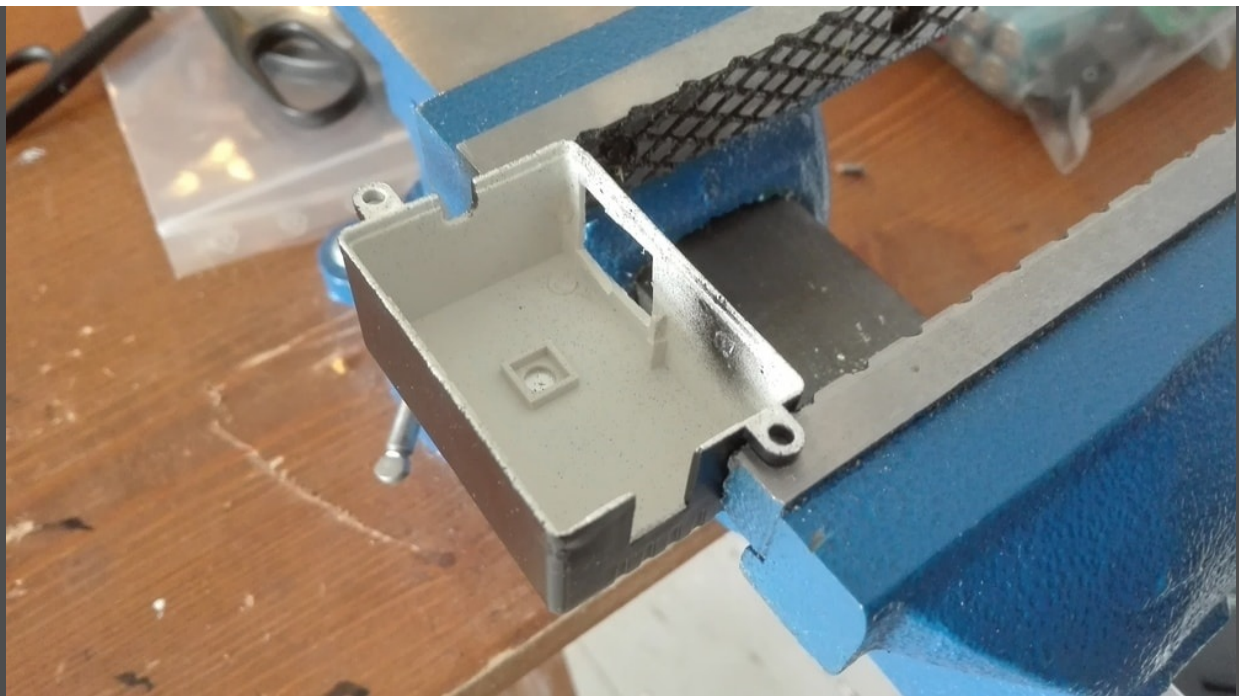
neat and you always have to decide independently whether the project allows such an implementation. This could also be measured very accurately, but the work invested would not pay off in the end. You should discuss something like this with the customer beforehand and explain it to him in an understandable way, my customer wanted to have the work done as quickly as possible. Since the device is mounted under a bar counter and the switch is only there to not always have to work with 24 batteries during the preparation of the party, you can do it this way. The LED bar must later light up fancy and be controllable by remote control. That is the important point.



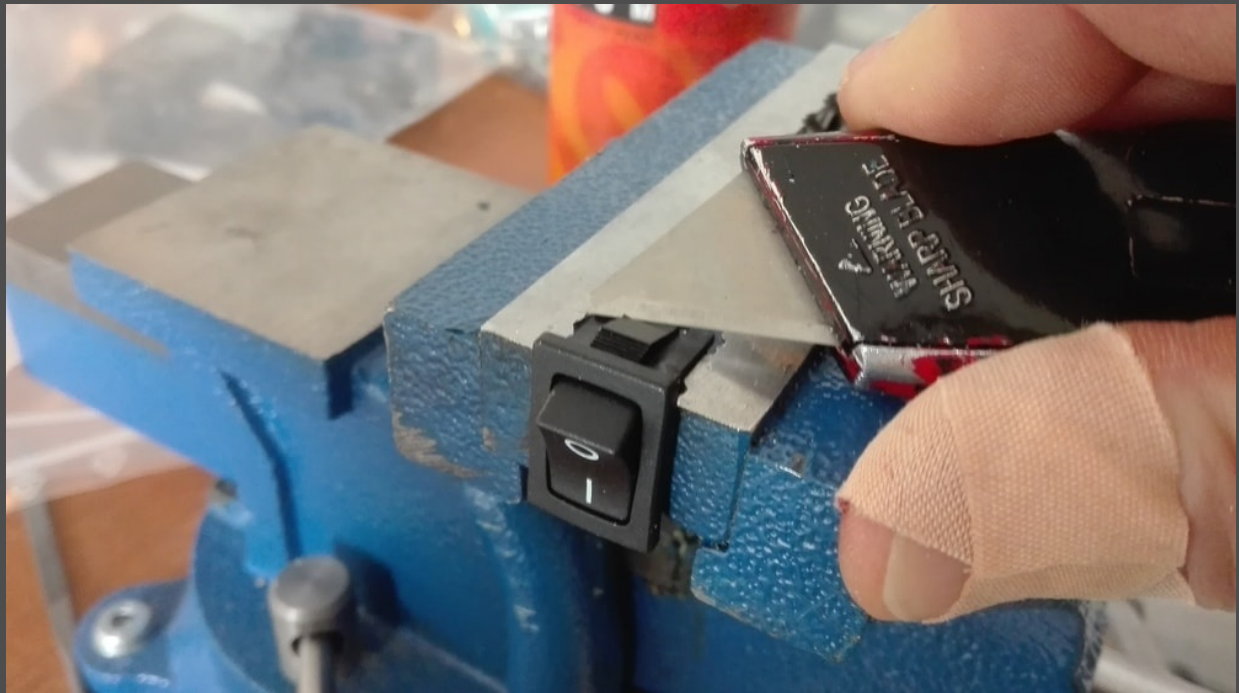
Before I bought a multifunctional tool, I built one myself from old parts. I ordered some additional components from the internet. You underestimate that in many cases, but if you think a little about what a certain tool has to do, you can build it yourself. I had all the parts from an old printer that didn't cost me anything. If you start small, you can do it this way and save money for a better machine.



Now we can cut out the superfluous parts of the case. Our on/off switch is then inserted into the hole.



Be careful when sawing, because even with a very small saw blade you can cut off a finger. I had a fall once, which wasn't so bad. I simply glued the housing with superglue and clamped it in a parallel vice to dry it. There it could dry in peace until I had finished the other cases.



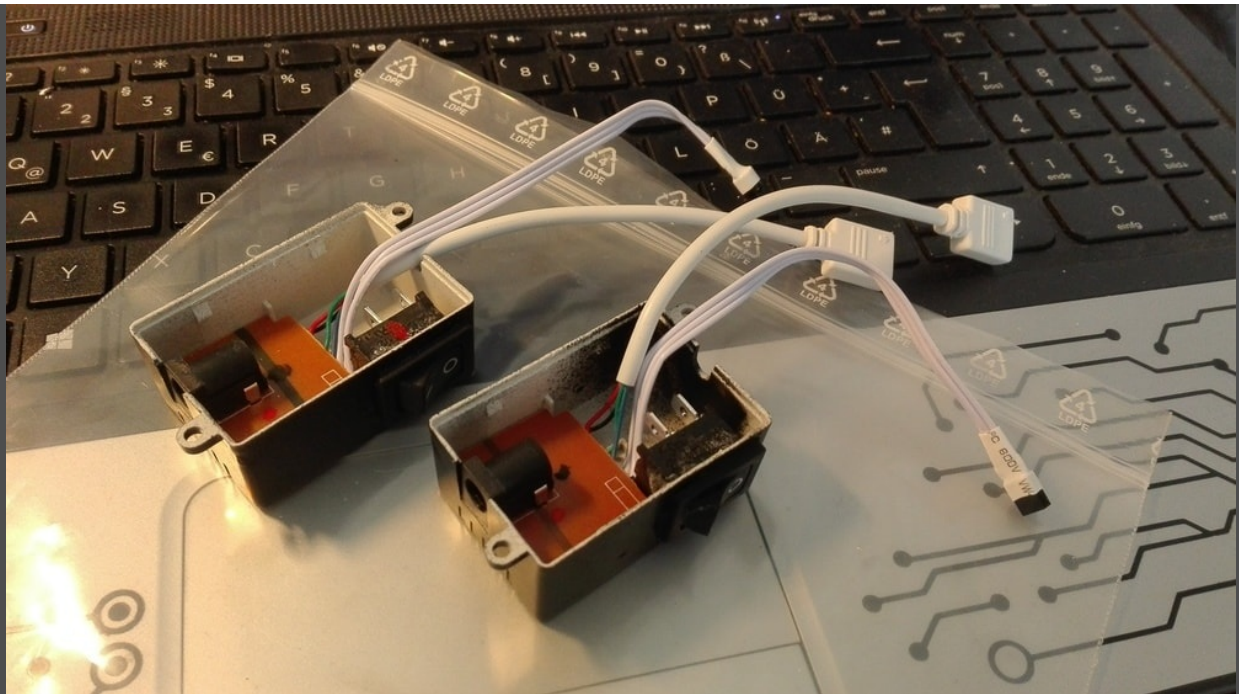
Usually the small arcs on the sides of the toggle switch are there to hold it in the created version. In most cases this eliminates the need for rigid fixing with adhesives and, if necessary, the switch can be loosened and reused more easily after the project has been completed. Since the plastic housing is unfortunately too fragile, the sides were machined with a carpet knife and the arches removed to prevent the housing from breaking.



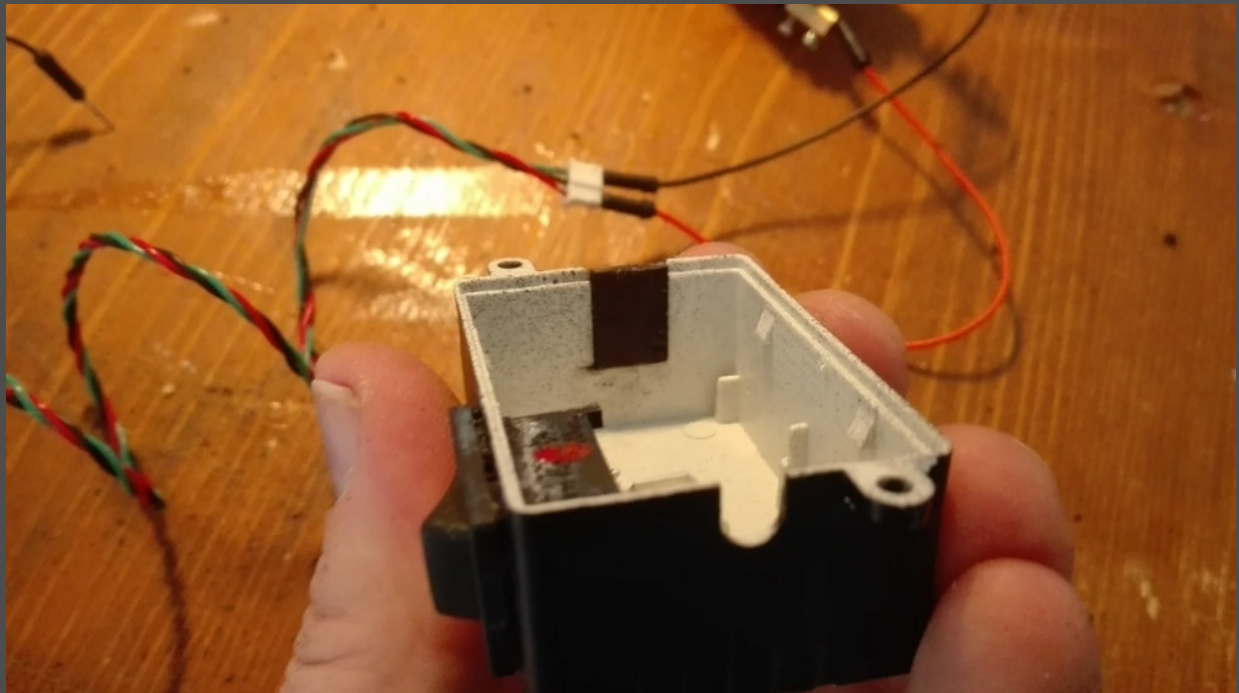
We place the toggle switch on its back and glue it with the second glue. You don't just have to work fast, you don't have to stick your own fingers to the component. If this happens to you, please use solvent or nail polish remover with acetone to remove the switch from your hand.



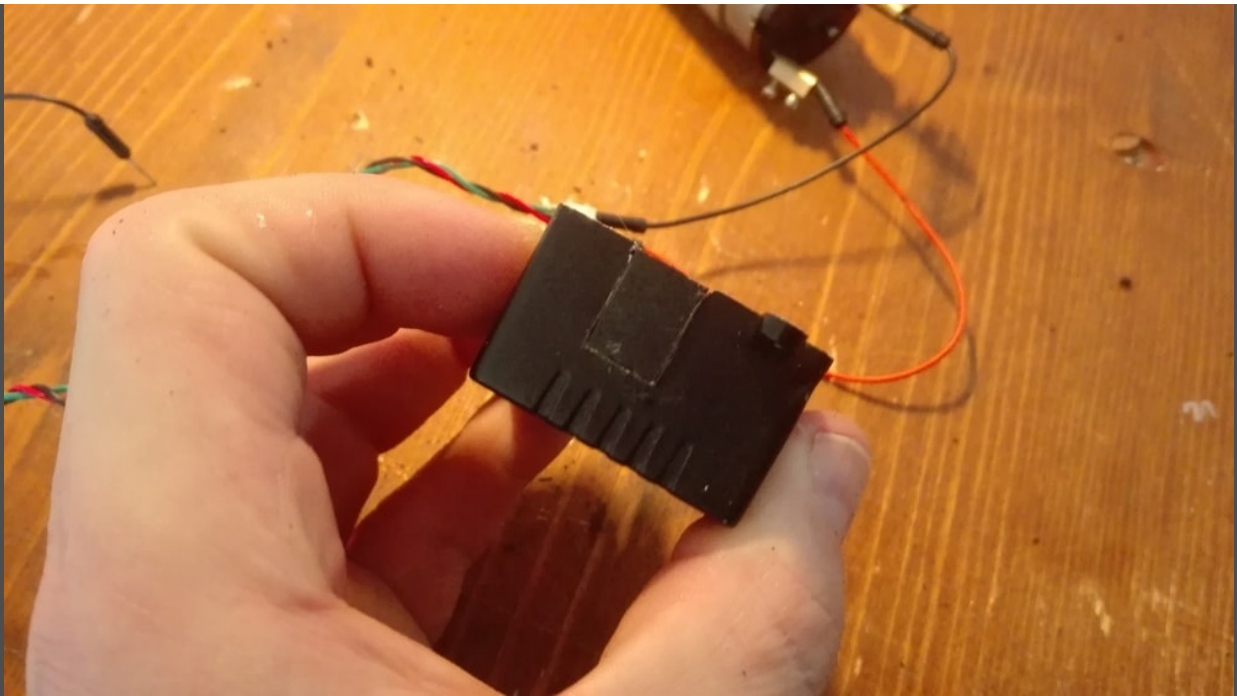
If you don't pay attention in unimportant places, you can not only save time, but it looks like it came from the factory. Unfortunately, it takes years of experience and you can watch as many Youtube tutorial videos as you like. The best way to learn is to work on projects. Between projects, ideas are tried out and expermined. When something works well, you use the technique for your own work. Tutorial videos are not bad, you just have to find your own...work flow?



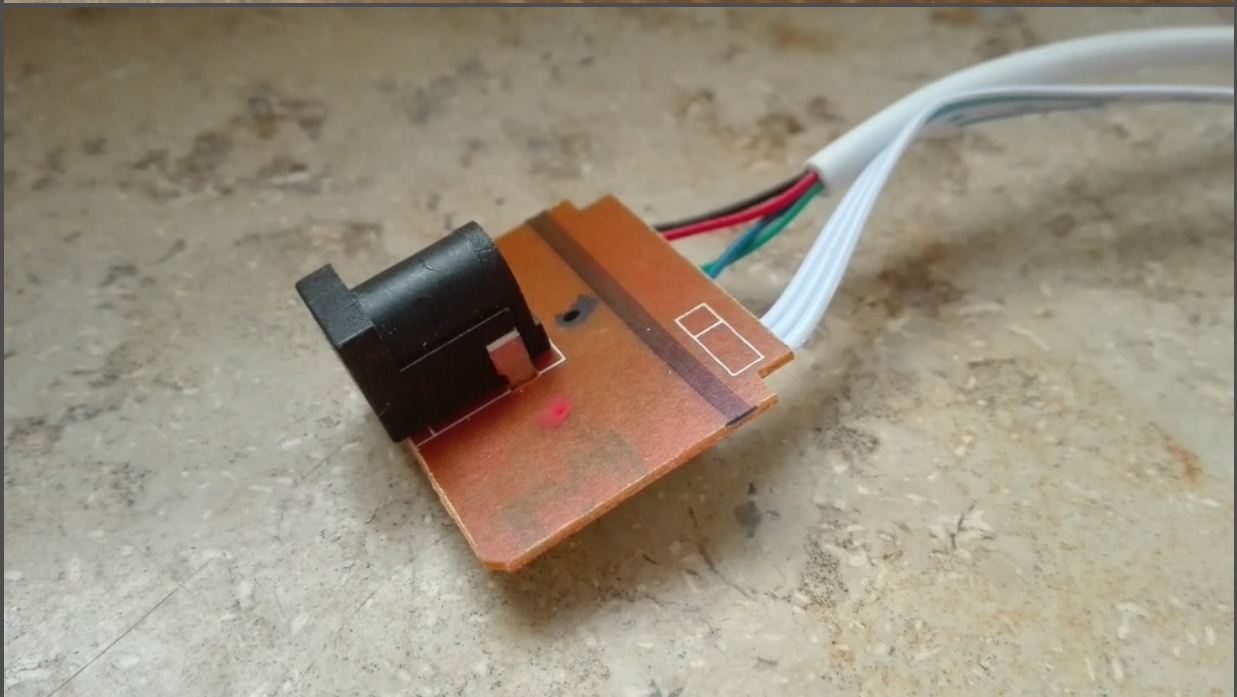
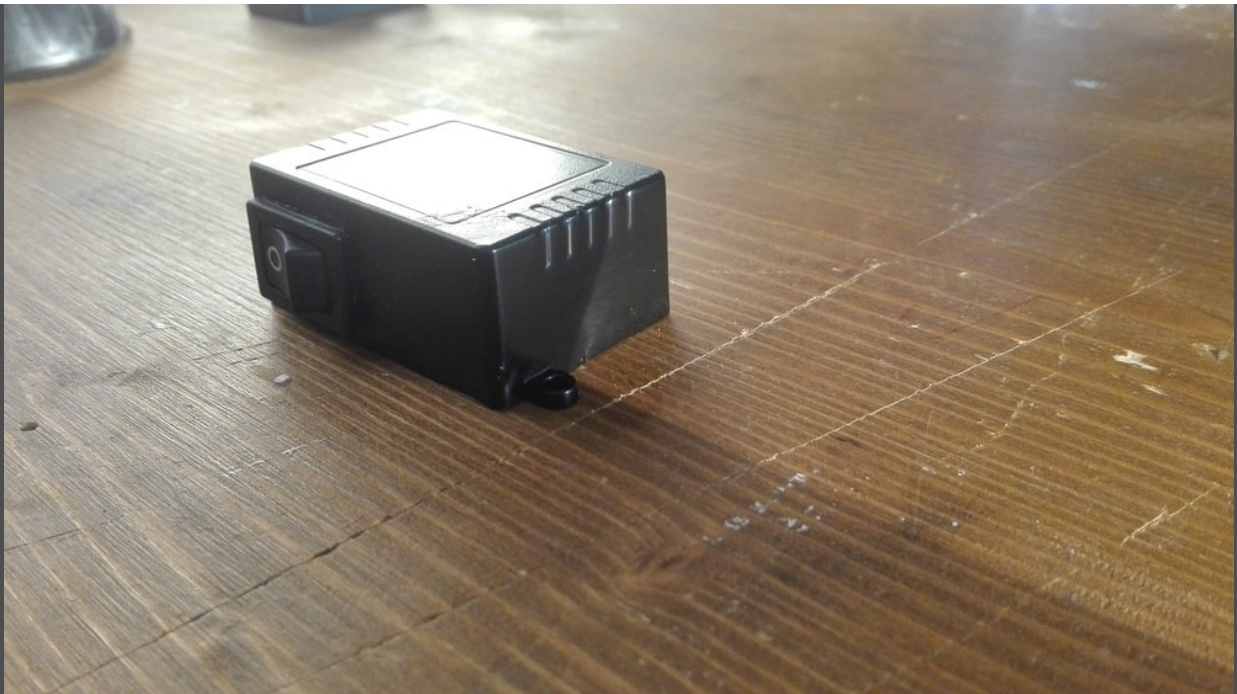
The toggle switch is used for all sets. In the next step, the recess at the position of the mains plug is filled with a piece of plastic, sanded, painted several times and thus closed. This makes the plastic housing look tidier, as the socket for the mains plug is not used in this project.



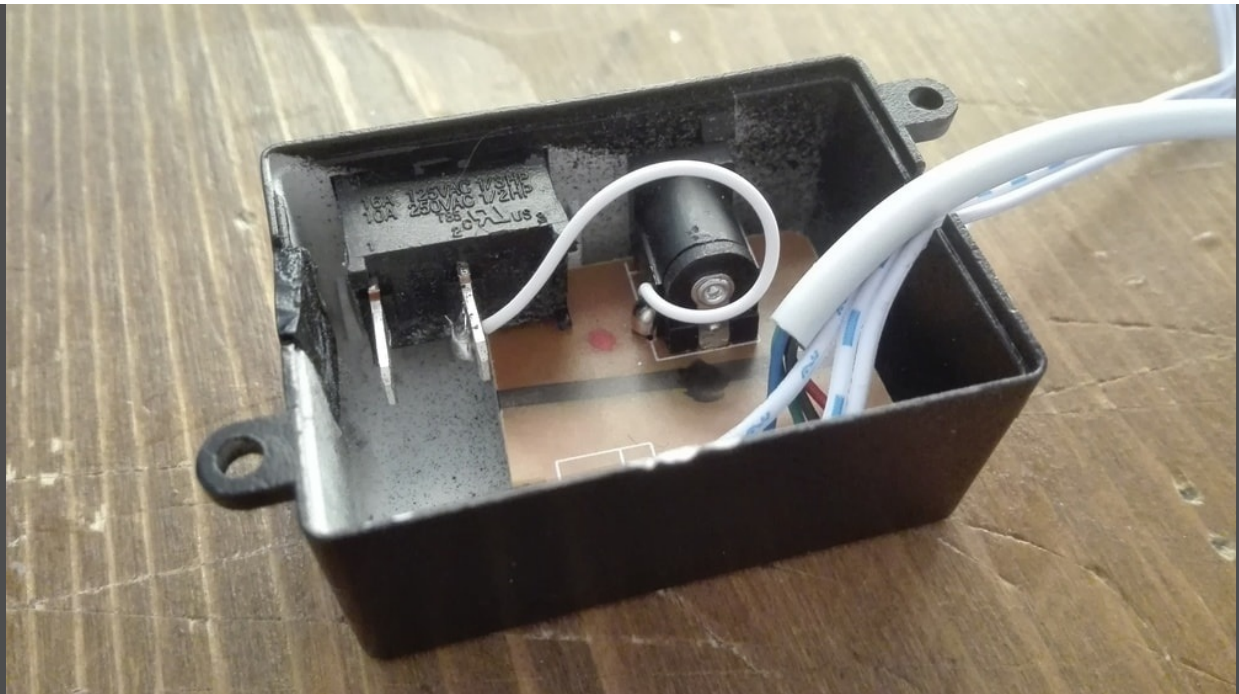
To close the gap in the case, the material that was previously cut out of the case is used. Similar material from other projects can also be used, it should only be the same material group (here plastic). A suitable piece of plastic is cut and inserted into the gap for testing.



After application and bonding, the edges are filled, sanded and repainted. This process is repeated several times until a sufficient result has been achieved. When grinding, we always use a grinding block. This work process is complex and very difficult to automate, as it takes a certain amount of time before you have sufficient experience in dealing with plastics and techniques.



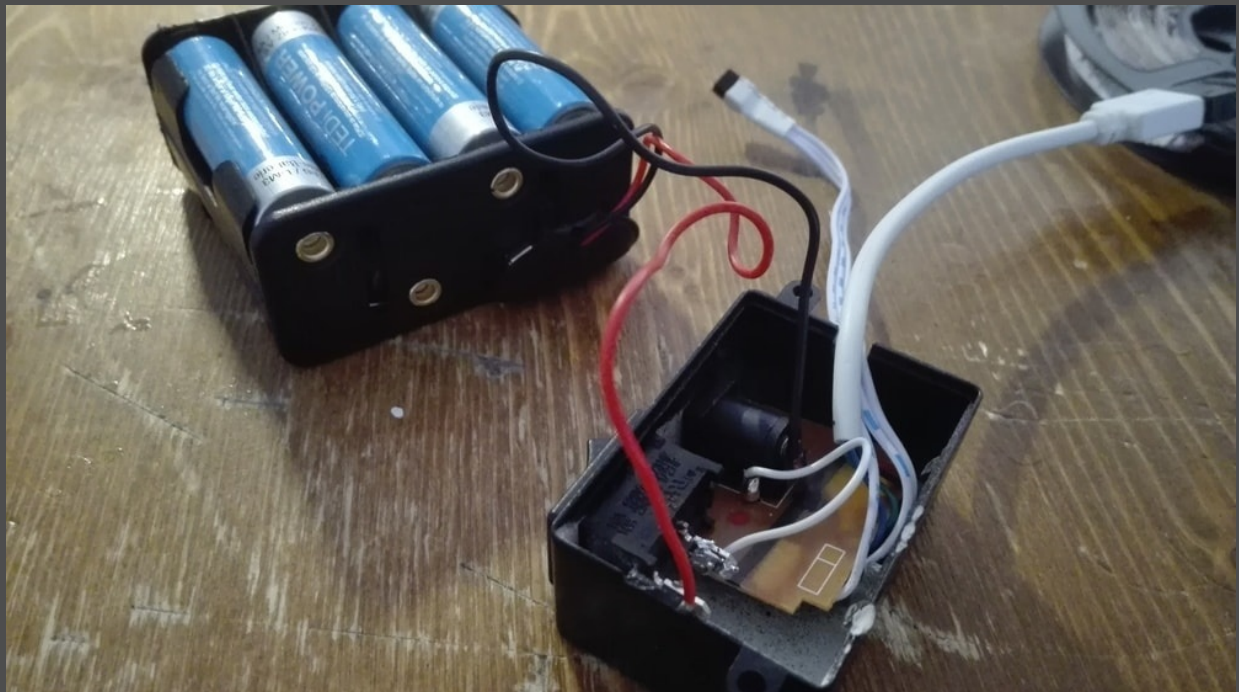
In order not to interchange the different contacts during soldering, they are marked with a red and black waterproof marker on the top of the board. Since the board will later be installed invisibly in the housing, the markings can no longer be seen from the outside.



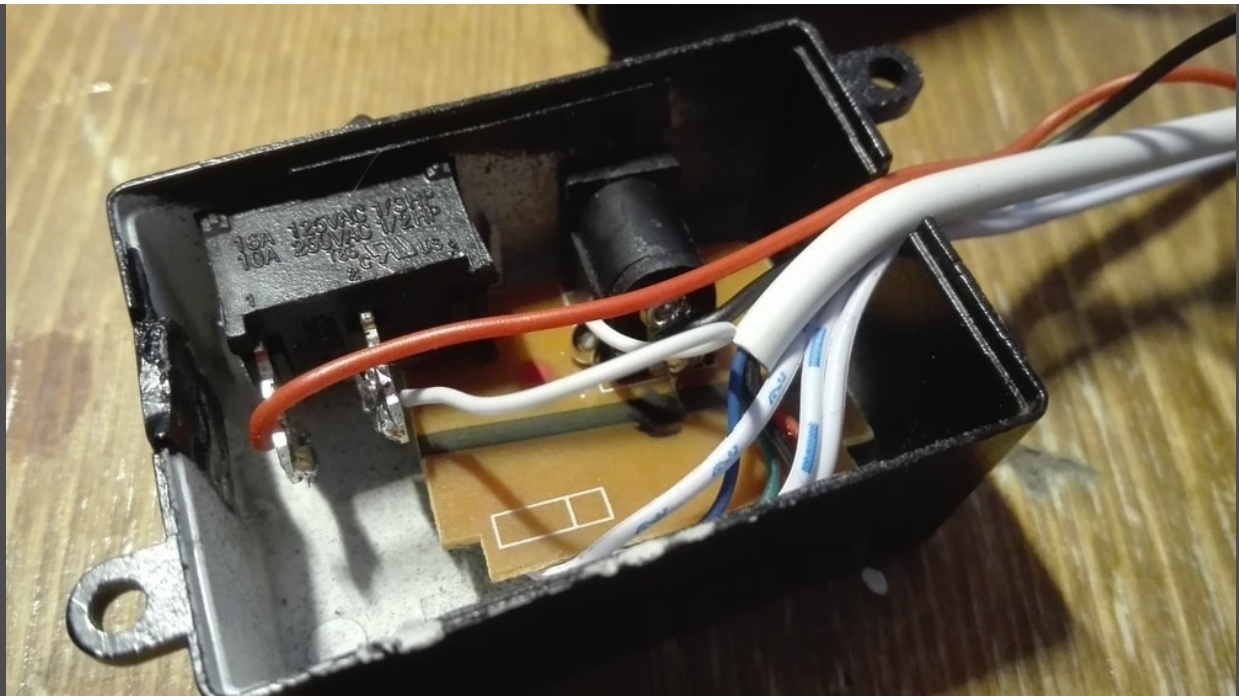
The soldered white cable on the contacts of the socket and the toggle switch. This initiates the circuit, which is then completed with the connections of the battery clip.

Update

During the installation on site I had to realize that the black and white cables at the socket for the mains plug have to be desoldered and replaced again, because otherwise the switching to other colours no longer works. During the final test I had only tried the function to see if the LED strips were lit and not also if the colors could be switched with the remote control. Unfortunately I can't adjust the photos, because the technology is already installed.

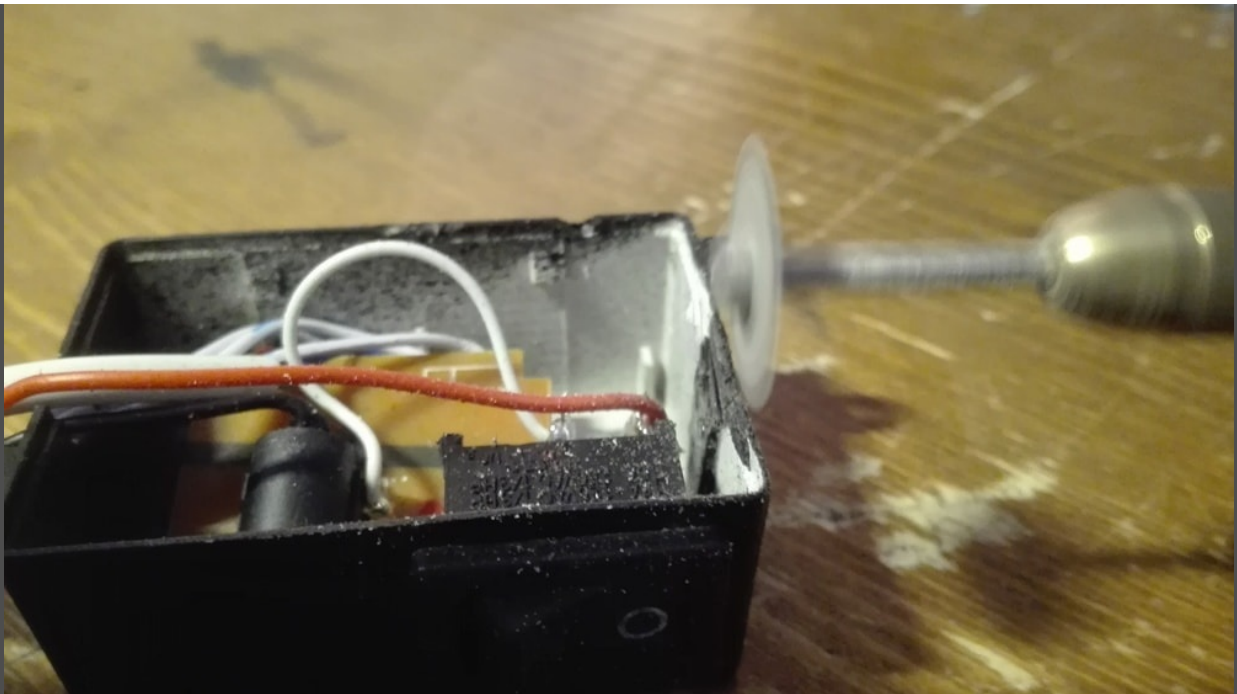


The red and black cable is soldered as shown in the photo. There is not much to consider with three cables and the possibility to make a mistake is very small even for a beginner. The red cable is connected from the battery clip to the free metal rod of the toggle switch. The black one from the battery clip to the power supply socket.



Since we close the housing with the cover properly, we have to put the entire wiring through the given opening, which requires a little fumbling work. For this purpose, the lid had to be adapted to the toggle switch used with a pair of pincers, and the new piece of plastic was also processed a little bit.

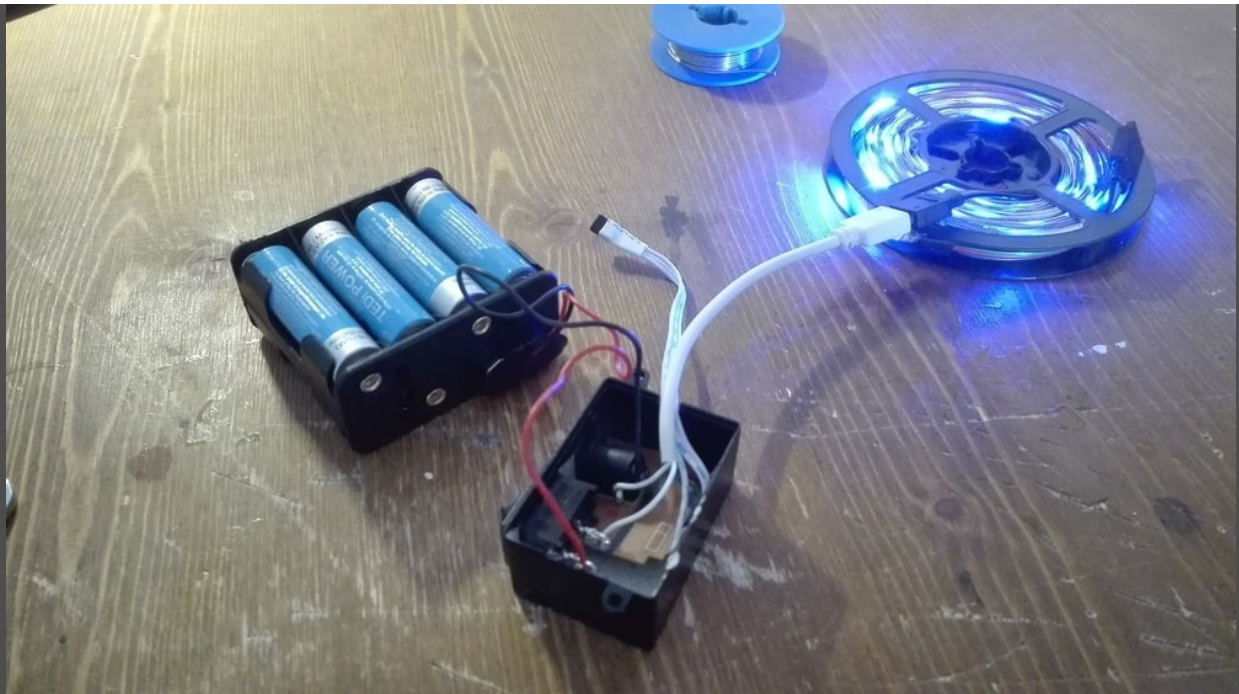




We still have to modify the lid a little bit because of the used toggle switch, but this does not pose a problem. To ensure that the lid also fits, a small edge must also be sawn into the inserted plastic with the multitool. These are still minor rework that is required for every project and these should always be taken into account in the time schedule beforehand. It's always the extra little things that cost the most time.



Here we see the battery clip and the box for the batteries before they are finally soldered to the hardware.



Before the lid is put on, we test the entire technology for functionality. If no errors or other irregularities are found, everything is closed and bagged airtight for collection.

Conclusion

The project was completed within one day and could be handed over to the customer. There were no problems worth mentioning, but they were in most cases caused by my experience and routine. Before you make a mistake. The customer does not buy the hardware, but will only use it for one night and I will pick it up again. If a customer comes in the future and wants to rent these three sets, you can then adjust the price, because you do not have to include any components. Your customer only pays for the installation and batteries. Always keep this in mind when you sign contracts, whether the customer wants the hardware. Most of the time there is more trouble at these points.